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AUTHOR Uselmann, Michael S.
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ABSTRACT

The focus of this study was to determine whether significant differences existed in reward preference in a learning task among preschool children from low income families. There were no statistically significant effects, and no clearcut differences between preferences for material, verbal, or physical reinforcement. It was concluded that the variable is not in the socioeconomic status factor alone. Further research studies should be designed to examine the variables of age, sex, familiar figure as reinforcer, race, and developmental level of children. (Author/DM)

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The Effectiveness of Three Classes of Reinforcers on the Performance of Children from Low Income Families*

Michael S. Uselmann

UD011270

Department of Home Management and Family Living

The University of Wisconsin

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Michael S. Uselmann

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Interpretations of the role of social reinforcement (reinforcement provided by another person) in concept acquisition historically has led to confounding and contradictory conclusions. Few conclusive replications of past experiments have been made; the evidence thus far reveals a great deal of speculation concerning variables that must necessarily be accounted for in learning situations. Important variables concerning type and schedule of reinforcement which merit systematic examination include the following: social class; sex of Ss and E (subjects and experimenter); chronological age; anxiety and social deprivation; previous history of reinforcement.

With social class as the variable, Terrell, Durkin and Wiesley (1959) showed that middle-class children learn more quickly when given a non-material incentive than when given a material incentive; the reverse was true of lower-class children. Zigler and Kanzer (1962) found that praise reinforcers were more effective for lower-class than for middle-class children, while "correct" reinforcers are more effective for middle-class than for lower-class children. Rosenhan and Greenwald (1965) found no main effects from the variable of sex, socioeconomic class or type of reinforcement. Safer and Kornreich (1968) failed to replicate the findings of previous studies regarding differences in discrimination learning between Ss of differing S.E.S.

The interaction effect in reinforcement literature concerning sex of

E and of S has stimulated a great deal of speculation but little conclusive evidence to confirm this theory. Gerwirtz and Baer (1958) found an interaction effect with male nursery school Ss and a female E in a semi-isolation condition. This lends support, in the author's view, for Freud's Oedipal theory. Lewis (1965) failed to find a significant sex difference when he controlled for I.Q., while Stevenson (1961), using third graders in a marble-drop task, found that approval by a female E increased performance of female Ss over male Ss. This is in contrast to the Rosenhan and Greenwald study where boys were more influenced by person reinforcers and girls more influenced by performance reinforcers. McManis (1966) failed to find a cross-sex effect between E and Ss when verbal incentives were used. When considering only sex of S and type of incentive, Marshall (1969) found that immediate information added to the material reward of the combination condition appeared to improve performance of low EE (educational environment) boys and the high EE girls, but not the high EE boys.

Rosenhan and Greenwald (1965) attempted to replicate the Zigler and Kanzer (1962) study, hoping to verify age differences in responsiveness to person and performance reinforcers. They discussed the phenomenon of a developmental process marked by a growth from primitive reinforcement (i.e., concrete, personal) and a corresponding increment in responsiveness to more mature (i.e., abstract, impersonal, performance) form of reinforcement. In their second study they offered a different view of maturation: ". . . maturation involves increasing sensitivity to a broader class of reinforcers, perhaps more specifically, to abstract reinforcers. But no decrement in responsiveness to person or concrete reinforcers is implied

in maturation (p. 120). McGrade (1966) attempted to replicate the Zigler-Kanzer study and failed to find evidence of an interaction effect between reinforcers and age.

The underlying question in anxiety and social deprivation research concerns reinforcement as a drive state or learned response. Gewirtz and Baer (1958) found that social deprivation increased reliably the reinforcing power of adult approval for Ss as a positive function of the degree to which the Ss typically sought approval from their nuesery school teacher. "The effectiveness of a social reinforcer may be increased by its own deprivation" (Gewirtz & Baer, 1958, p. 54). Lewis supported this theory with results showing that the increases in length of time Ss are deprived of social reinforcement results not in a monotonic but the interaction between time and need for social reinforcement resulted in a parabolic relationship.

Conflicting results concerning attitude or warmth of E previous to testing have been reported. Gewirtz and Baer (1958) reported a satiation affect when E is warm and friendly preceding testing; Berkowitz and Zigler's (1965) results showed a warm and friendly E preceding testing enhanced the performance in the test. Heckenmueller and Baron (1968) found that Negro college sophomores did not respond well to a white E who gave them high social reinforcement. Their interpretation was that Negro Ss are not accustomed to receiving high praise from white figures resulting in a negative effect.

Baron (1966) suggested that the individual's past history of social reinforcement defines for him a baseline by which he judges social reinforcement as it occurs. It is then assumed that a person reacts and displays certain activities which will merit him the specific level of social reinforce-

ment he prefers. Baron suggested the view that social reinforcement intended as positive would produce a negative effect if it supercedes a person's base level of reinforcement. He suggests three reasons why this may occur: future disappointment--the idea that the S feels he may not live up to the expectation and therefore fail himself and the reinforcing -agent' guilt feelings--that the reinforcing agent is being given a false impression of the capabilities of the S and therefore the S feels guilt; credibility of reinforcing agent--that the S is wary of the source of reinforcement and is concerned about possible alterior motives of the reinforcing agent.

The major concern of the study was to determine if significant differences existed in reward preference in a learning task among children from low income families. The hypothesis was: childrer from low income families, being rewarded in a learning situation, will learn more quickly with physical (P) reinforcement or material (M) reinforcement than verbal (V) reinforcement, i.e., $P \geq M > V$.

The Method

Subjects

A total of 45 pre-school children ranging in age from three to five years were tested with the Marble-in-the-Hole game. The Ss were of disadvantaged background according to the national Head Start guidelines, which defines "disadvantaged" according to income level. Ss included 33 children currently enrolled in Head Start classrooms and another twelve Ss obtained from Child Development Inc., which is a pre-school nursery designed to absorb children who meet Head Start financial guidelines, but for other reasons are unable to attend Head Start. The sample contained

15 Ss in each of three reinforcement situations: material, physical, and verbal. The Ss were randomly selected from children available in Head Start and Child Development Inc. centers in Madison, Wisconsin.

Reinforcement

Material (M)--the child was reinforced upon correct choice with a piece of candy, which was placed next to him; he was allowed to eat it when he wished.

Physical (P)--the child was reinforced upon correct choice with a hug, i.e., an embrace from the E sitting beside him.

Verbal (V)--the child was reinforced upon correct choice with the statements, "good" and "fine".

Materials and Procedure

A set of 10 red building blocks, 40 marbles, and two plastic containers were used. The box used for the Marble-in-the-Hole game was wooden with two 1/2 inch holes in the top with foam rubber inside to eliminate, as much as possible, auditory reinforcement. The size of the box in inches was 12x12x24. A children's folding table was used to hold the box and the E and Ss sat on folding children's chairs.

The child was instructed to insert the marbles from the first of two containers, one at a time, into either hole. The S was told to put all the marbles into the holes; the E made note of the least preferred hole and that hole was later reinforced. The child was then given a second container of 40 marbles and told that he was to do the same thing but this time there was one "correct" hole and one "incorrect" hole. In order to facilitate his understanding of the directions, he was told that there was one hole that you "wanted" him to put the marble into and the other which you did

not want' him to put it into. The Ss were scored in terms of the number of correct responses, putting the marble in the hole that was reinforced, over 40 trial periods.

Results

Results of the analysis of variance are reported in Table 1.

It is apparent from this table that there were no statistically significant effects, i.e., P=M=V. The test of the treatment effect resulted in a F ratio of .54; $p < .59$. The test of sex effect resulted in a F of .13; $p < .72$. The interaction between sex and treatment resulted in a F of .61; $p < .55$.

Insert Table 1 about here

Table 2 shows the treatment for boys and girls separately. Analysis of the mean effects of four-and five-year-olds was analized according to sex. The three-year-olds were excluded from this analysis because of their low N. The interesting aspect of this analysis showed a slight divergence exists between boys and girls under treatment M, while treatment P is nearly equal, and finally an even wider divergence in treatment V.

Insert Teble 2 about here

Consideration was given for mean effects for all Ss when compared to the mean effects when eliminating three-year-olds. The slight contrast apparent in this analysis might indicate a developmental trend moving

from preference for material reward at a younger age to more symbolic reward in later years.

Discussion and Conclusion

Although statistical significance was not obtained in the present study, there are several relevant aspects which tend to support consideration for future studies involving conditions of this experiment.

The first salient finding that might well be considered is the lack of significance where other studies found significant results. As reviewed earlier, other researchers have found that lower-income children tend to function more effectively with material as opposed to verbal reward. The lack of significance in this study rejects this hypothesis. There is not only the lack of any clearcut difference between material and verbal, but likewise there is no difference between the latter two and physical reinforcement.

These results lead to the conclusion that if there is a significant difference in reward preference, the variable is not in the SES factor alone. Although material and physical rewards provided higher means for the total sample, some tendency favoring verbal reinforcement was found for four- and five-year-olds (see Table 2), although the difference remained non-significant.

The sample obtained for this study may have inhibited the objective of the design. The sample was taken from a small city of 200,000 people with few low income families. This may indicate that the difference in reward preference is determined not simply as a result of SES but other factors, such as environment, affect reward preference as well. If the studies that contend that the low SES prefer material to verbal reward hold true (e.g., Dowan, Durkin, & Wesley, 1959), then the factor

influencing the present study may be the social and cultural contacts the family has within the community. If these contacts are strong and frequent, it may be sufficient to affect the reward preference of the low SES family.

The data from this experiment suggest other interesting developments which might conceivably be considered in a second study. It can be seen in Table 2 that there is a tendency for girls to prefer verbal reinforcement over material reinforcement, while boys appear to be more highly motivated by material reward. It is suggested, if the three-year-olds are included, that there might possibly be a developmental trend supporting Rosenhan and Greenwald's (1965) suggestion that children progress in time from a "lower" form of reinforcement (i.e., material, tangible), to "higher" types of reinforcement (i.e., verbal, person, intangible). A second study might consider the sex difference as well as a developmental age difference in reward preference in a learning situation, i.e., differing reward preferences of Ss when controlling sex of Ss and E (Gerwirtz & Baer, 1958; Stevenson, 1961).

Future studies might consider two more factors which could easily influence reward preference: familiar figure as the rewarding agent and sex of E and S. There is some evidence that small children would be more accepting and more appreciative if a familiar person such as a teacher or a member of his family were reinforcing him with a hug. The second factor may be the E's sex. In our culture, it is normally the female or mother who rewards the child with a hug. This familiarity with maternal affection may carry over to a learning situation. This may be especially true within low income families where an affectionate male figure may be seldom

present or totally absent from the home. Thus, physical signs of affection from males may seem strange to such children and resisted.

In addition to the sex of the E, future studies might seriously consider the factor of race of Ss and E as they affect responses of Ss. Sattler (1970) concluded that the race of the E appears to play a critical role when black children are performing cognitive or decision-making tasks.

Further studies within the area of the preschool disadvantaged child might well consider the developmental trend in reinforcement theory. In addition, the sex differences as they relate to differing forms of reinforcement should be investigated further. This study indicates a trend that boys might function differently than girls under similar types of reinforcement. The sex of the E thus might prove to be the most important variable, especially if the reward is a physical one.

The above results do not support studies which show that the disadvantaged child responds better with material reinforcement than verbal reinforcement. The study shows, in fact, that there is no significant difference between these three types of reinforcement used with the low SES Ss participating in the project.

TABLE 1

Summaries of Analysis of Variance for the Total Sample

Source	D.F.	MS	F	p
Between	5.	102.04		
Treatments	2.	113.52	.54	.59
Sex	1.	26.58	.13	.72
Interaction	2.	128.29	.61	.55
Within (Error)	39.	210.01		
Totals	44.	197.74		

TABLE 2

Mean Performance by Sex

Treatment

	Material (M)		Physical (P)			Verbal (V)			$\bar{X}$	SD
		SD			SD			SD		
Boys (N=9)	21.78	13.53	(N=9)	26.56	15.3	(N=12)	25.08	11.7	25.47	2.69
Girls (N=6)	29.00	13.4	(N=6)	21.17	14.04	(N= 3)	31.33	8.37	27.17	4.34
	25.39			23.86			29.71			

Footnotes

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